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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,111	10/15/2003	Trung T. Doan	108298731US	7235
25096	7590	11/24/2004	EXAMINER	
PERKINS COIE LLP			BERMAN, JACK I	
PATENT-SEA				
P.O. BOX 1247			ART UNIT	
SEATTLE, WA 98111-1247			2881	
			PAPER NUMBER	

DATE MAILED: 11/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/687,111

Applicant(s)

DOAN, TRUNG T.

Examiner

Jack I. Berman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-52 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8, 15-17, 23, 24, 26, and 29-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuhlman et al. Kuhlman et al. discloses a method of preparing a sample for atom probe analysis, comprising:

positioning a surface of the sample with respect to a laser source;

directing laser energy from the laser source toward the surface to remove material from the sample, removing the material defining a recessed surface and leaving a regular array of projections of sample material projecting beyond the recessed surface, as is explained at paragraphs [0050] and [0051];

reducing a lateral dimension of at least a portion of each of the projections to form microtips having reduced-dimension apexes spaced from the recessed surface, as is discussed at, for example, paragraphs [0049] and [0042]; and

juxtaposing a selected one of the microtips with an electrode of an atomic probe, as is discussed at paragraph [0005]. This method would inherently leave the recessed surface extended laterally at least about 10 μm from the periphery of each projection in order to leave room for the other projections in the array. The flat nature of the slab of material used as the sample, as is suggested at paragraph [0045], would inherently cause the distance between the recessed surface and the apex of each microtip to be approximately equal and the outer end of

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each projection to be approximately coplanar with the remaining portion of the sample surface.

This uniformity is cited as an advantage of the method in paragraph [0044] of the published application. The analysis of a sample prepared by this method in an atomic probe would inherently cause the selective removal of material from the apex of the selected microtip because that is how atomic probes function. (See for example the patent to Panitz.)

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 12, 13, 18, 19, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhlman et al. At paragraph [0042], Kuhlman et al. teaches that it is known to reduce the diameter at the apex of a column to be used in atom probe analysis by milling the column with a focused ion beam incident on the column at a controlled angle of incidence. Since the published application also teaches, as is discussed above, that laser energy can also be used to cut a sample for atom probe analysis, it would have been obvious to a person having ordinary skill in the art to control the angle of incidence of such laser energy so as to mill the sample in the same way as is done with the focused ion beam.

Claims 9-11, 20-22, 25, 27, and 34-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhlman et al. in view of the article by Marcus et al. in Applied Physics Letters. At paragraph [0045], Kuhlman et al. teaches that the method of sample preparation and analysis disclosed in the application is useful for preparing and analyzing semiconductor wafers. Such wafers are conventionally made of silicon. Marcus et al. teaches that tips made of silicon

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can be sharpened by oxidizing silicon to form a silicon oxide layer, and then selectively etching the silicon oxide layer to provide a reduced-diameter apex. It would have been obvious to a person having ordinary skill in the art to use the Marcus et al. tip sharpening method to sharpen the preliminary projections formed by the Kuhlman et al. method when the sample comprises silicon. Such an etching method would inherently etch all the projections substantially simultaneously.

Claims 14, 28, 39-47, 51, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhlman et al. as applied to claims 12, 13, 18, 19, 32, and 33 above, and further in view of Kelly et al. From line 41 in column 3 through line 33 in column 4, Kelly et al. teaches to inspect a larger sample surface prior to preparing a study sample from the larger sample for analysis in an atom probe. It would have been obvious to a person having ordinary skill in the art to use Kuhlman et al.'s sample preparation method to prepare Kelly et al.'s study sample since the Kuhlman et al. method is disclosed as being intended for such a purpose. In using the Kuhlman et al. method to prepare a study sample from an area of interest in the manner taught by Kelly et al., the preparer would inherently remove material from locations proximate to the area of interest since that is the function of the laser ablation step taught by Kuhlman et al.

Claims 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhlman et al. and Kelly et al. as applied to claims 14, 28, 39-47, 51, and 52 above, and further in view of Marcus et al. as applied to claims 9-11, 20-22, 25, 27, and 34-38 above.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Panitz explains the operation of an atom probe. The patents to Marcus et al. and


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Quate illustrate that the tip-sharpening method disclosed in the Applied Physics Letters article can be used to sharpen tips other than tips to be used as electron sources.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack I. Berman whose telephone number is (571) 272-2468. The examiner can normally be reached on M-F (8:30-6:00) with every second Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jack I. Berman
Primary Examiner
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jb
11/21/04